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Electron interaction effects on Aharonov-Bohm resonances in an antidot-based quantum Hall interferometer WOO-RAM LEE, Korea Institute for Advanced Study, HEUNG-SUN SIM, Korea Advanced Institue of Science and Technology — We theoretically study the electron interaction effects on Aharonov-Bohm resonances in an antidot-based quantum Hall interferometer in the integer quantum Hall regime. We introduce a general capacitive interaction model for an antidot with multiple bound modes of edge states, and find that the pattern of Aharonov-Bohm resonances is governed by the spectator behavior: The resonances of some modes disappear and instead are replaced by those of the other modes, due to charge relaxation between bound modes in the cotunneling regime. This behavior gives a reasonable understanding on the nontrivial features of previous experimental data, e.g., spectator behavior in an antidot molecule and resonance peaks in a single antidot with two, three, or four modes. References:

[1] W.-R. Lee and H.-S. Sim, Phys. Rev. Lett. 104, 196802 (2010);
[2] W.-R. Lee and H.-S. Sim, arXiv: 1009.1004.

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